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Darby

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(54) **SUPPORTING AN OBJECT AT A WINDOW OF A BUILDING BY APPLYING OPPOSING FORCES TO AN INTERIOR SURFACE AND AN EXTERIOR SURFACE OF THE BUILDING**

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A47H 27/00	(2006.01)
E06B 7/28	(2006.01)

(52) **U.S. Cl.**

CPC ***A47H 27/00*** (2013.01); ***E06B 7/28*** (2013.01); ***F24F 13/32*** (2013.01)

(58) **Field of Classification Search**

CPC F24F 13/32; A01K 1/0353; A47L 3/02; E04G 23/00; E04G 5/00; F16M 13/02; F16M 11/10

USPC 248/208, 220.21, 226.11, 236, 209, 248/241, 316.8, 121, 187.1; 182/61, 53, 55, 182/57, 62, 58, 59, 60

See application file for complete search history.

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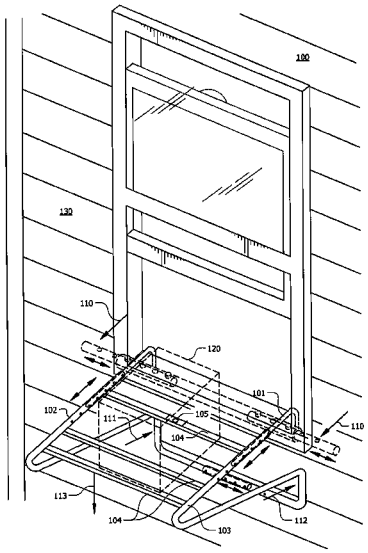
(57) **ABSTRACT**

An apparatus for supporting an object at a window of a building comprises a first member, a second member, and a third member. The first member extends along at least a partial width of the window and abuts an interior surface of the building. The first member is configured to support the object by exerting an outward force on the interior surface of the building in response to a downward force exerted by the object. The first member also comprises at least two sections extending from the interior of the building to the exterior of the building. These sections may extend from the interior of the building to the exterior of the building about respective distal ends of the first member. The sum of the forces applied on the surfaces of the building are sufficient to secure the object to the building.

9 Claims, 2 Drawing Sheets



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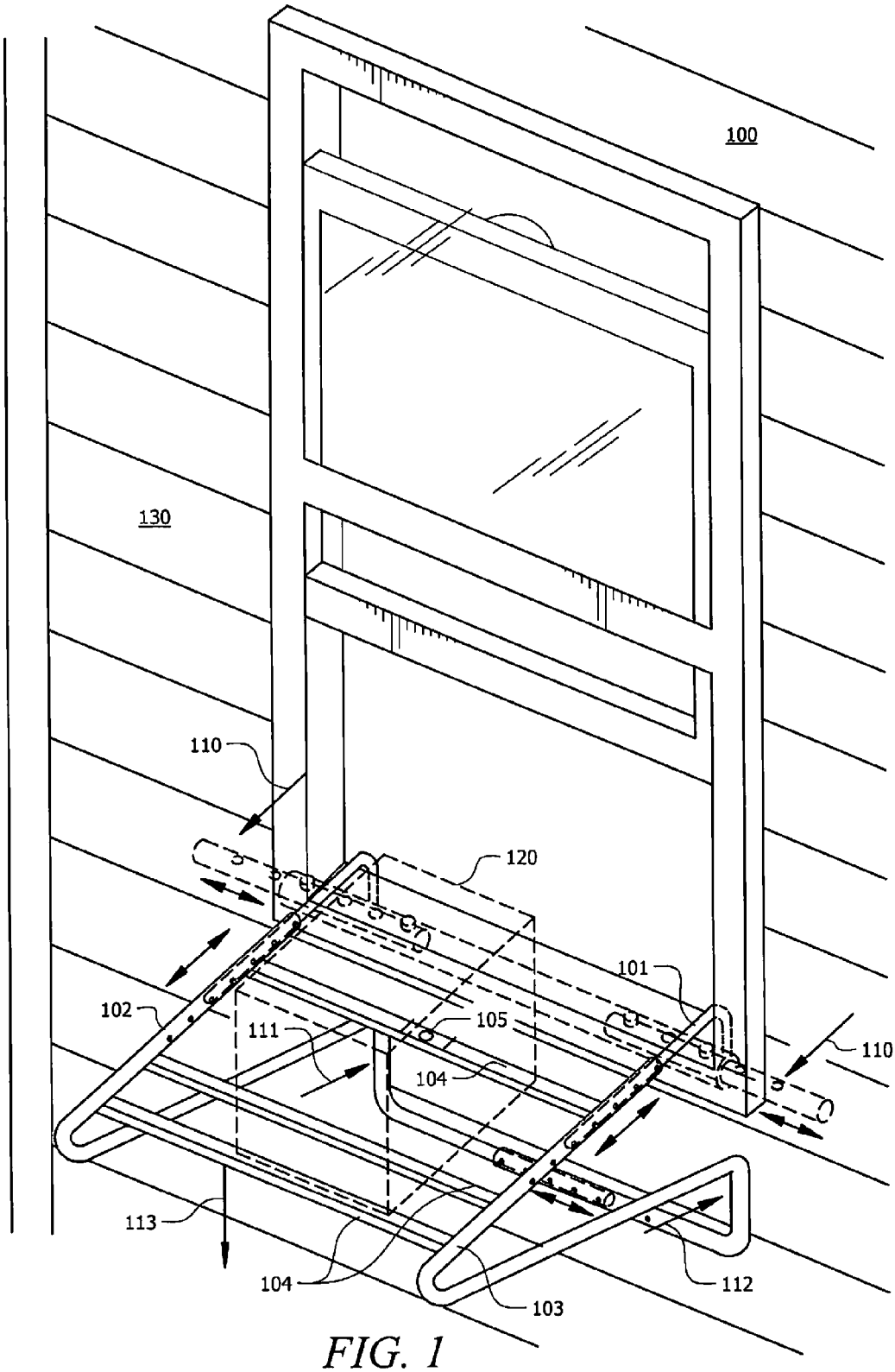

FIG. 1

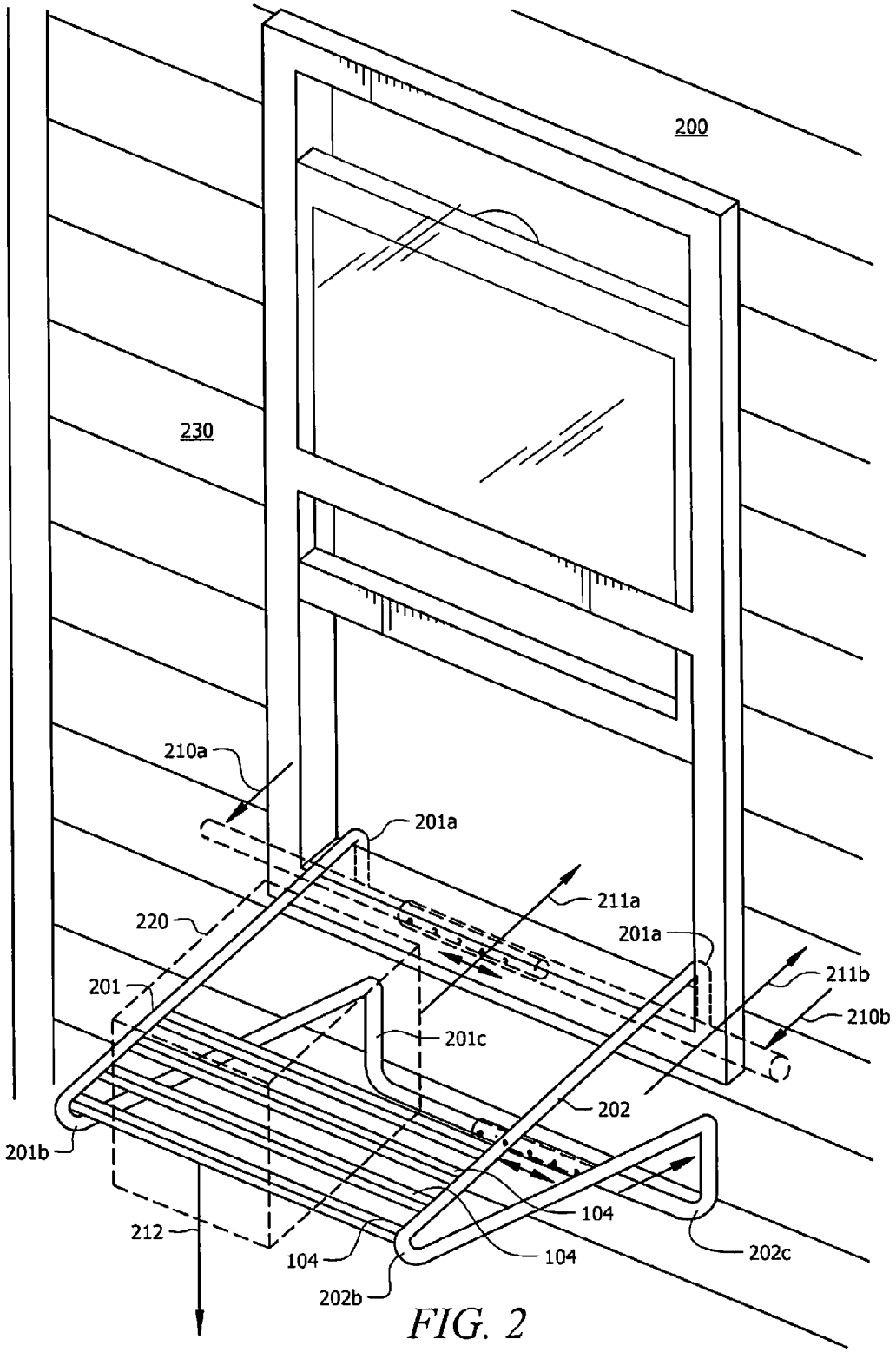
200
230
210a
201a
211a
220
201a
211b
201
210b
201c
202
201b
104
212
104
104
202c
202b

FIG. 2

SUPPORTING AN OBJECT AT A WINDOW OF A BUILDING BY APPLYING OPPOSING FORCES TO AN INTERIOR SURFACE AND AN EXTERIOR SURFACE OF THE BUILDING

BACKGROUND

Objects such as air conditioning units, plants, animal food and housing, decorative arrangements, and the like, are often secured adjacent to or partially within building windows, where a portion of those objects are located outside of the building. Since a portion of the object is located beyond the exterior of a building, there exists a potential for an object to fall from the window to the surface below. Of course, this is particularly problematic in urban areas, where several of such objects may be found in a single building, several stories above the ground surface.

As a result, strict safety regulations have been developed in some urban areas with regard to the installation and maintenance of, e.g., window air conditioning units. For example, the New York City Building Code sets forth specific guidelines that must be adhered to when such a unit is installed. Further, to date, air conditioners and other objects have been attached to a building utilizing support structures that are built into the building itself. As such, if the support system falters or is removed, the building is permanently altered or damaged. Therefore, a need exists for an object support apparatus that provides sufficient safety and does not damage or otherwise modify the building to which is secured.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention, reference is now made to the following description taken in conjunction with the accompanying drawings, in which:

FIG. **1** illustrates an embodiment of an apparatus for supporting an object at a window of a building according to the inventive concepts described herein; and

FIG. **2** illustrates another embodiment of an apparatus for supporting an object at a window of a building according to the inventive concepts described herein.

DETAILED DESCRIPTION

Embodiments described herein provide systems, apparatuses, and methods for supporting various objects about a window of a building while complying with municipal ordinances and other applicable safety requirements and not requiring any modification and/or damage to the building or window itself. Such objects include air conditioning units, plants, animal food and housing, decorative arrangements, and the like.

According to an embodiment, an apparatus for supporting an object at a window of a building comprises a first member, a second member, and a third member. The first member extends along at least a partial width of the window and abuts an interior surface of the building. The first member is configured to support the object by exerting an outward force on the interior surface of the building in response to a downward force exerted by the object. The first member also comprises at least two sections extending from the interior of the building to the exterior of the building. These sections may extend from the interior of the building to the exterior of the building about respective distal ends of the first member.

The second member is coupled to one of first member sections extending from the interior of the building to the exterior of the building. Also, the second member is configured to support the object by exerting an inward force on an exterior surface of the building in response to the downward force exerted by the object.

The third member is coupled to another of the first member sections extending from the interior of the building to the exterior of the building. Similar to the configuration of the second member, the third member is also configured to support the object by exerting an inward force on the exterior surface of the building in response to the downward force exerted by the object.

The sum of the outward force extorted by the first member on the interior surface of the building and the inward forces exerted by the second member and the third member on the exterior surface of the building are sufficient to oppose the downward force of the object. In other words, the sum of the outward force exerted by the first member on the interior surface of the building and the inward forces exerted by the second member and the third member on the exterior surface of the building are sufficient to support the object at the window.

Each of the first, second, and third members may be reversibly coupled to one another. That is, according to some embodiments, the first member is reversibly coupled to each of the second member and the third member. Further, in other embodiments, the second member and the third member are reversibly coupled to one another, e.g., at some location along the length of the first member. The coupling mechanism may be adjustable such that the dimensions of the apparatus may be adjusted in terms of length, width, and height, to accommodate objects of different sizes. Each member may couple to the other via, e.g., a slideable adjustment mechanism.

According to another embodiment, an apparatus for supporting an object at a window of a building comprises a first member and a second member. Each of the first member and the second member comprise an interior section extending along at least a partial width of the window and abutting an interior surface of the building. The interior sections are configured to support the object by exerting an outward force on the interior surface of the building in response to a downward force exerted by the object. The first member and second member also comprise intermediate sections that extend from the interior section at the interior of the building to the exterior of the building. Further, the first member and second member comprise exteriors sections that extend from the intermediate sections and are configured to support the object by exerting an inward force on an exterior surface of the building in response to the downward force exerted by the object. The first and second members are coupled to one another at least at their respective interior sections and exterior sections.

Certain embodiments may be modular, comprising components that are of adjustable dimensions and configurations, being able to accommodate standard (albeit different) building dimensions and materials, window dimensions, and objects of various dimensions. This modularity also provides for easy packaging, assembly, and repair or flexible arrangement and use. Components of systems and apparatuses according to the inventive concepts are thought to advantageously comprise one or a combination of lightweight materials that impart sufficient strength such as, for example, steel, aluminum, or fiber-reinforced plastic, and the like. Accordingly, the entire weight of the object is supported by systems and apparatuses without modification and/or damage to the adjoining building.

FIG. **1** illustrates an embodiment of an apparatus for supporting an object at a window of a building according to inventive concepts described herein. According to the embodiment illustrated at FIG. **1**, apparatus **100** comprises

first member **101**, second member **102**, and third member **103**. First member **101** is engaged with second member **102** and third member **103** at sections of first member **101** that extend from the interior of building **130** to the exterior of building **130** at each of its respective distal ends. First member **101** is configured to apply an outward force to an interior surface of building **130** in response to a downward force exerted by object **120** being supported by apparatus **100**. The outward force exerted by first member **101** is illustrated by vector **110**.

Second member **102** and third member **103** are each coupled to first member **101** and are configured to apply an inward force to the exterior surface of the building **130** in response to the downward force exerted by object **120**. The inward force exerted by second member **102** is illustrated by vector **111** and the inward outward force exerted by third member **103** is illustrated by vector **112**. As will be described in more detail, first member **101**, second member **102**, and third member **103** operate to secure object **120** to building **130** without requiring any damage and/or modification to building **130** while complying with stringent municipal ordinances and other applicable safety requirements.

First member **101** is configured to extend at least along a partial width of an aperture of a building, e.g., a window, and abut an interior surface of the building on either side of the window. In some embodiments, first member **101** may extend along the entire length of the window or beyond the width. First member **101** may reversibly engage second member **102** and third member **103** by various attachment mechanisms. By way of example, first member **101** may comprise one or more notches that are configured to accept corresponding protrusions from second member **102** and third member **103** (e.g., by virtue of a male and female arrangement). In any event, first member **101** and second member **102** may form an engaged position second member **102** and third member **103** such that each is locked with respect to one another and may later be maneuvered by a user to an unengaged position, so that each may be moved or separated from one another. The reversible engagement between first member **101** with second member **102** and third member **103** (whether by a fastener, removable pins, or aligned notches and/or grooves) is advantageous because it allows the dimension of apparatus **100** to be adjusted in terms of length, width, and height to accommodate objects **120** of different sizes and each may be folded with respect to one another for packaging, transport, and the like. With each member able to be packaged while being separated from every other member, packaging and transport costs are greatly reduced.

Optionally, a sealing member configured to seal the interior of building **130** from the exterior of building **130** may be formed around the sections of first member **101** extending from the interior of building **130** to the exterior of building **130** (or second member **102** and third member **103**) and the surface of a window second member **102**.

First member **101** is variable along the width of the window so that apparatus **100** may be utilized with windows of different widths. The adjustments should be sufficient to permit a width of first member **101** to be adjusted to exert sufficient outward force to the interior surface of building **130**. In some embodiments, the width of first member **101** is adjusted so that first member **101** is sufficiently wider than a width of the window opening. According to one embodiment, first member **101** comprises a central portion and two telescoping distal portions, each of which may be actuated between a retracted and extended position to ensure a desired length. According to another embodiment, first member **101** may comprise two pieces, where one slides along the length of another to form a desired length. In either case, consistent with the discussion herein, the length may be fixed by a reversible fastener means, one or more securing pins or bolts, or a latch mechanism. Finally, a soft material, such as rubber or a rubber composite, may cover first member **101** to prevent damage to the interior surface and/or window surrounding.

Second member **102** and third member **103** extend from respective intermediate sections of first member **101** and support object **120** along their top surface. Second member **102**. The length of second member **102** and third member **103** may be adjusted to accommodate different objects **120** and building walls of different thickness. According to one embodiment, second member **102** and third member **103** may comprise and outer sleeve that slides along the length of the intermediate sections of first member **101** extending from the interior of building **130**. In that case, the intermediate sections of member **101** may be thought of as inner sleeves, where its length of apparatus **100** is adjusted by sliding the intermediate sections of first member **101** and along the length second member **102** and third member **103**. Length adjustments may be performed by aligning appropriate apertures in the inner sleeve and outer sleeve and inserting a securing pin or fastener through the aligned apertures. Length adjustments may also be performed by sliding the sleeves or segments along a series notches or grooves so that it each is seated in a desired notch or groove at the desired length.

Further, it should be appreciated that second member **102** and third member **103** (illustrated as a single component at FIG. **1**) may, in fact, be configured with or comprise other structures that may be configured according to specific dimensions of object **120**. For example, second member **102** and third member **103** may be configured with two or more rods **104** or beams extending there between. The spacing between the multiple rods or beams **104** may be configured be a user to support the edges of object **120**. Such a configuration is thought to be advantageous in that it will inhibit object **120** from becoming lopsided due to high winds, unbalanced weight, and the like.

The lower portions of second member **102** and third member **103** extend to building **130** at an angle from their top portions, i.e., where object **120** exerts a downward force illustrated by the vector **113**. Accordingly, second member **102** and third member **103** structurally operate to resist the downward force exerted by object **120** that would otherwise cause object **120** to fall to the surface or rotate inward toward building **130**. As such, second member **102** and third member **103** provide a supportive force, where the supportive force has at least a component perpendicular to the exterior surface of building **130**, keeping object **120** separate from building **130**. Further, first member **101** provides an equal, opposing supporting force perpendicular to the interior surface of building **130**. In this way, first member **101**, second member **102**, and third member **103** restrain motion of object **120** with respect to building **130**.

In one embodiment, second member **102** and **103** extend along the width of first member **101** along their lower distal ends and are reversibly coupled to one another. Second member **102** and third member **103** may be coupled along a location aligned with the medial portion of first member **101**. Similar to the previous discussion, each may be adjusted by sliding along their respective length, etc. In this way, the width of apparatus **101** may be varied.

The length of second member **102** and third member **103** and the angles at which each extend toward building **130** may vary according to different considerations. For example, 1) the orthogonal or near orthogonal distance from the surface of building **130** at which second member **102** and third member

103 meets first member 101, and/or 2) the distance below first member 101 at which second member 102 and third member 103 abuts the surface of building 130 may be varied. This may be done to accommodate objects of different lengths, city ordinances, applicable safety regulations, and the like. According to one embodiment, the distance from the surface of building 130 at which second member 102 and third member 103 couple with first member 101 may be varied by sliding the end of each along a series notches or grooves so that they may be seated in a desired notch or groove. According to other embodiments, second member 102 and third member 103 can be adjusted along the length of intermediate sections of member 101 by nut and bolt combinations, screws, or a reversible fastening mechanism, such as adjustable clamping or biasing means. For example, according to one embodiment, second member 102 and third member 103 may be attached to a respective intermediate section of first member 101 by a bolt or pin inserted through a pair of aligned apertures in each (defined through either the horizontal or vertical surfaces of each).

The lower distal ends of second member 102 and third member 103 that abut building 130 may be adjustable so that they remain flush against the surface of building 130 even where the angle of second member 102 and third member 103 change with respect to the surface of building 130. In one embodiment, each comprises an adhesive material that provides sufficient resistance to alter movement, holding object 120 in a fixed position. According to another embodiment, the lower end of each may be in combination with or comprise a foot such as a resilient, vibration isolation pad secured thereto, which effectively serves as a "non-skid" pad.

As seen from the previous description, object 120 is supported along building 130 by virtue of the physical arrangement between first member 101, second member 102, and third member 103, because the physical arrangement of those components provides sufficient forces against both the interior and exterior surfaces of building 130 in response to the downward force exerted by object 120. As such, no further mechanical support is needed. Instead, by virtue of this arrangement, the surfaces of building 130 are leveraged to secure object 120 thereto. That is, according to the embodiment illustrated in FIG. 1, the downward force exerted by object 120 on apparatus 100 operates to bias first member 101 toward the interior wall of building 130. In doing so, the bias is of sufficient magnitude to hold first member 101 at a fixed position at the interior surface of building 130. Simultaneously, the downward force exerted by object 120 on apparatus 100 operates to bias second member 102 and third member 103 toward exterior surface of building 130. The bias is of sufficient magnitude to hold the lower distal ends of second member 102 and third member 103 at a fixed position at the exterior surface of building 130.

Apparatus 100 may further comprise level indicator 105, which includes a bubble floating in a liquid contained in an elongated, clear tube. The level indicator may also include a first line disposed across the tube toward the distal end thereof and a second line disposed across the tube toward the proximal end thereof. After placing object 120 in an initial position, reference may be made to level indicator 105. The angle of second member 102 and third member 103 may be adjusted as described above, until the floating bubble indicates that object 120 is at a desired angle with respect to building 130.

FIG. 2 illustrates another embodiment of an apparatus for supporting an object at a window of a building according to inventive concepts described herein. According to the embodiment illustrated at FIG. 2, apparatus 200 comprises first member 201 and second member 202. First member 201 comprises sections 201*a*, 201*b*, and 201*c* and second member 202 comprises 202*a*, 202*b*, and 202*c*.

Interior section 201*a* extends along at least a partial width of the window and abuts an interior surface of building 230. Interior section 201*a* supports object 120 by exerting an outward force on the interior surface of building 130 in response to a downward force exerted by object 220 on apparatus 200. The outward force exerted by interior section 201*a* is illustrated by vector 210*a*.

Intermediate section 201*b* extends from interior section 201*a* at the interior of building 130 to the exterior of building 230. Intermediate section 201*b* extends from interior section 201 at a distal end of interior section of 201*a*.

Exterior section 201*c* extends from intermediate section 201*b* and is configured to support object 220 by exerting an inward force on an exterior surface of building 130 in response to the downward force exerted by object 220. The inward force exerted by interior section 201*c* is illustrated by vector 211*a*.

Interior section 202*a* extends along at least a partial width of the window and abuts an interior surface of building 130. Interior section 202*a* supports object 220 by exerting an outward force on the interior surface of building 230 in response to a downward force exerted by object 220 on apparatus 200. The outward force exerted by interior section 202*a* is illustrated by vector 210*b*.

Intermediate section 202*b* extends from interior section 202*a* at the interior of building 130 to the exterior of building 230. Intermediate section 202*b* extends from interior section 202 at a distal end of interior section of 202*a*.

Exterior section 202*c* extends from intermediate section 202*b* and is configured to support object 220 by exerting an inward force on an exterior surface of building 230 in response to the downward force exerted by object 120. The inward force exerted by interior section 202*c* is illustrated by vector 211*b*.

First member 201 and second member 202 may be coupled to one another according to any number of mechanisms as discussed herein. According to a preferred embodiment, each are reversibly coupled to one another along their respective interior sections and exterior sections and slide or move with respect to one another to vary the dimensions of apparatus 200.

According to the operation of apparatus 200, the sum of the outward forces exerted by the interior sections of members 201 and 202 on the interior surface of building 230 and the inward forces exerted by the exterior sections of members 201 and 202 on the exterior surface of building 230 are sufficient to oppose the downward force of object 220. The downward force exerted by object 220 is illustrated by the vector 212. In other words, the sum of the outward forces exerted by the interior sections of members 201 and 202 on the interior surface of building 130 and the inward forces exerted by the exterior sections of members 201 and 202 on the exterior surface of building are sufficient to support object 220 at the window.

The previous description of the disclosure is provided to enable any person skilled in the art to make or use the disclosure. Various modifications to the disclosure will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other variations without departing from the spirit or scope of the disclosure. Thus, the disclosure is not intended to be limited to the examples and designs described herein but is to be accorded the widest scope consistent with the principles and novel features disclosed herein.

The invention claimed is:

1. An apparatus that supports an object at a window of a building, the apparatus comprising:

an adjustable first member that extends beyond a width of the window on both sides of the window and abuts an interior surface of the building beyond both sides of the window in an extended position, where the first member supports the object by exerting an outward force on the interior surface of the building beyond both sides of the window in response to a downward force exerted by the object, where the first member comprises at least two sections extending from the interior of the building to the exterior of the building;

a continuous second member when coupled to one of the at least two sections of the first member supports the object by exerting an inward force on an exterior surface of the building in response to the downward force exerted by the object; and

a continuous third member when coupled to another of the at least two sections of the first member supports the object by exerting an inward force on the exterior surface of the building in response to the downward force exerted by the object;

wherein the second member and the third member are coupled to one another at a location of the inward force exerted by the second and third members and at a location aligned about a medial portion of the first member.

2. The apparatus of claim 1 wherein a sum of the outward force exerted by the first member on the interior surface of the building and the inward forces exerted by the second member and the third member on the exterior surface of the building are sufficient to oppose the downward force of the object.

3. The apparatus of claim 1 wherein a sum of the outward force exerted by the first member on the interior surface of the building and the inward forces exerted by the second member and the third member on the exterior surface of the building are sufficient to support the object at the window.

4. The apparatus of claim 1 wherein the second member and the third member are coupled to the first member via a slideable adjustment mechanism.

5. The apparatus of claim 1 further comprising at least one support extending between the second member and the third member and configured to further support the object.

6. An apparatus that supports an object at a window of a building, the apparatus comprising:

an adjustable first member that extends beyond a width of the window on both sides of the window and abuts an interior surface of the building beyond both sides of the window in an extended position, where the first member supports the object by exerting an outward force on the interior surface of the building beyond both sides of the window in response to a downward force exerted by the object, where the first member comprises at least two sections extending from the interior of the building to the exterior of the building;

a continuous second member when coupled to one of the at least two sections of the first member supports the object by exerting an inward force on an exterior surface of the building in response to the downward force exerted by the object; and

a continuous third member when coupled to another of the at least two sections of the first member supports the object by exerting an inward force on the exterior surface of the building in response to the downward force exerted by the object

wherein the first member is coupled to each of the second member and the third member via a slideable adjustment mechanism and wherein the second member and the third member are coupled to one another at a location of the inward force exerted by the second and third members.

7. The apparatus of claim 6 wherein a sum of the outward force exerted by the first member on the interior surface of the building and the inward forces exerted by the second member and the third member on the exterior surface of the building are sufficient to oppose the downward force of the object.

8. The apparatus of claim 6 wherein a sum of the outward force exerted by the first member on the interior surface of the building and the inward forces exerted by the second member and the third member on the exterior surface of the building are sufficient to support the object at the window.

9. The apparatus of claim 6 further comprising at least one support extending between the second member and the third member and configured to further support the object.

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 9,179,794 B2
APPLICATION NO. : 13/958453
DATED : November 10, 2015
INVENTOR(S) : Jason Darby

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Specification:

At column 4, line number 9, delete "Second member 102.".
At column 4, line number 14, delete "and" and replace with --an--.
At column 4, line number 24, insert --of-- after "series".
At column 6, line number 2, insert --sections-- after "comprises".

In the Claims:

At column 8, claim number 6, line number 26, insert --;-- after "mechanism".

Signed and Sealed this
Twenty-eighth Day of June, 2016

Michelle K. Lee

Michelle K. Lee
Director of the United States Patent and Trademark Office